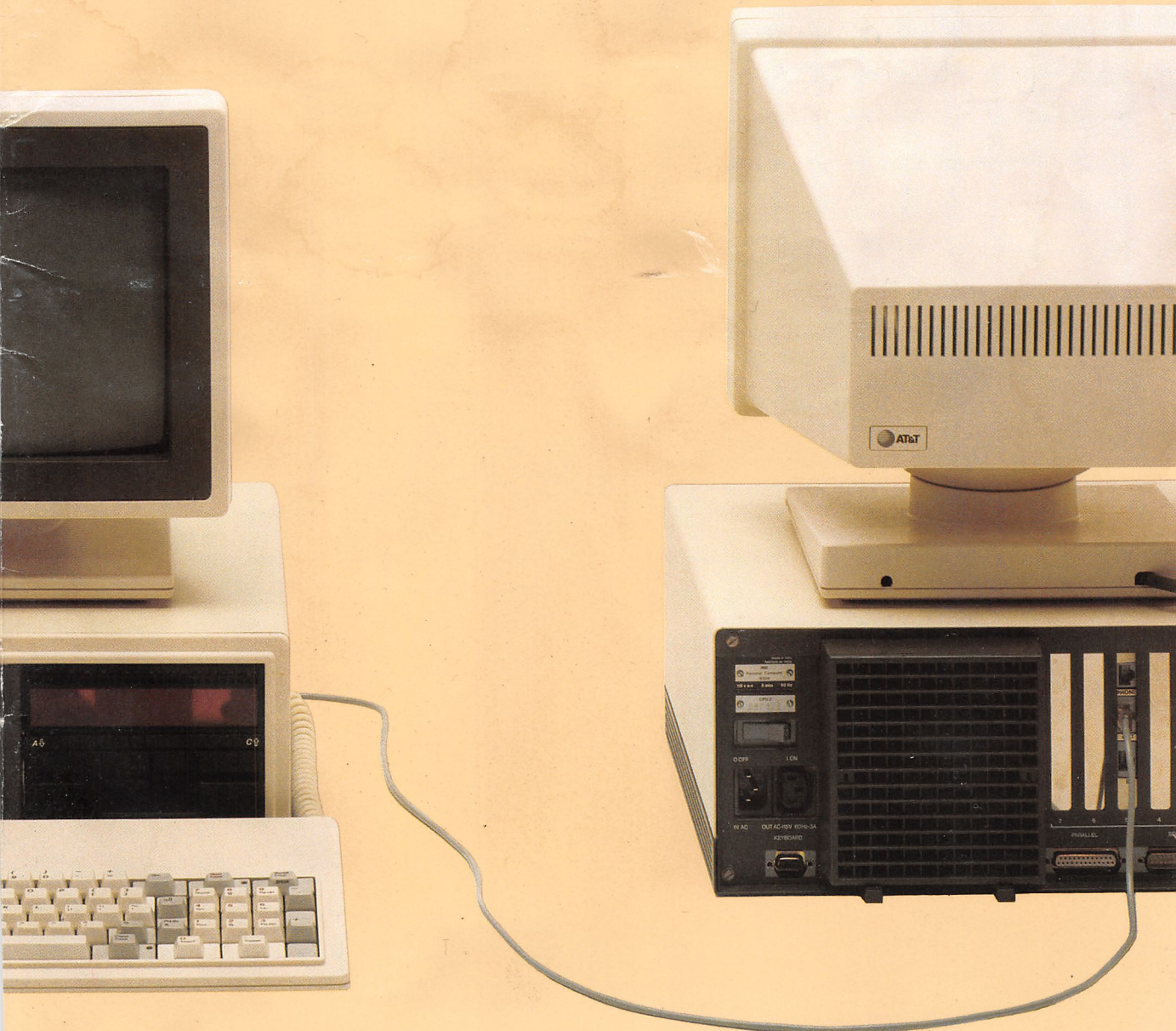




STARLAN NETWORK Introduction

**The Computer Network
with the Future Built In**



The AT&T STARLAN NETWORK: The Solution to Your Information Sharing Problems

The AT&T STARLAN NETWORK is a low-cost, easy-to-install solution to your information sharing problems.

- With the STARLAN NETWORK, you and your co-workers can share reports, spreadsheets, graphics, other data, network software programs, and network printers—all from your keyboard.
- To join the network, a computer needs only two parts: a plug-in expansion card called a Network Access Unit, and a STARLAN NETWORK software program.
- Installing the network is easy. Simply install a Network Access Unit in each computer, load the network software, and connect the computers with ordinary modular phone cord. A large network can be connected through your building's existing phone wiring.

Just as you can upgrade AT&T personal computers to incorporate new computer technology, you can upgrade your STARLAN NETWORK to include future AT&T computers. The STARLAN NETWORK advances AT&T's commitment to provide you with the newest advances in computer technology while you retain your present computer investment. It's the computer network with the future built in.

The computers you can link to the STARLAN NETWORK include

- AT&T Personal Computer 6300 and PC 6300 PLUS
- IBM® PC, PC-XT™, PC-AT™, and other PC 6300 compatible computers
- AT&T UNIX™ PC Models 7300 and 3B1
- AT&T 3B2 line of computers.

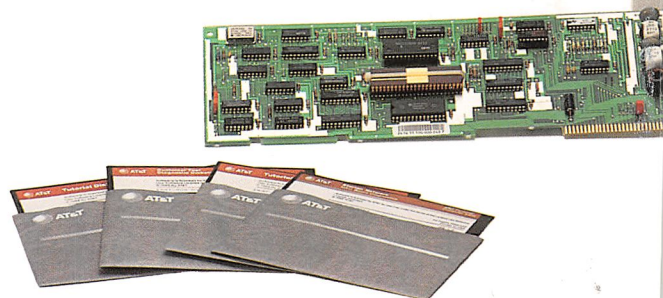
You use the same MS-DOS® or UNIX commands on the network that you use with your computer operating system. Network data and programs are stored on a computer called a server.

Choose the computer that best fits your budget and networking needs as the server. For example, a PC 6300 with a hard disk is an effective server for a DOS-based network of five PC 6300s and compatible computers.

With a UNIX PC or 3B2 as a server, MS-DOS-based computers can communicate to UNIX-based computers. A 3B2 is an effective server for a network of ten or more MS-DOS-based and UNIX-based computers.

You can include as many servers in a network as you need. And each server can also function as a network workstation.

Users store network data and programs in network directories, and can share their network directories with other users. For example, you might share a directory of quarterly expense figures that your sales and production managers can read but not change. Or you might write a draft of a marketing letter for your sales manager to both read and revise, but restrict it so that no one else can read it.



In addition to storing network directories, a server manages network printers. The network print commands are the same commands you use to run a printer connected to your PC.

Software that runs on the MS-DOS 3.1 or later operating system, the UNIX PC System Software Version 3.0 or later, and the UNIX System V Release 3 or later operating system is compatible with the STARLAN NETWORK. And so are IBM PC Network applications.

Installing, using, and expanding the STARLAN NETWORK is as easy as plugging a phone into a wall jack, as you'll see from the experience of Partners Accounting.

A **server** is a computer that stores network directories and manages network printers. The number of servers appropriate for a STARLAN NETWORK arrangement depends on the demands your workstation computers place on it. A PC 6300 with hard disk used as a server can manage up to eight active MS-DOS-based workstations, and up to 16 simultaneous connections. A network with more active workstations, or whose users require extensive file space for data and applications, should use more than one PC 6300 server or a UNIX PC as a server. A network with more than ten active users who require extensive file space should consider a 3B2 server.



Put Together Your Own Network

The **Network Access Unit (NAU)** is a plug-in expansion card that handles the electronics of moving data between the computer and the network. It enables the computer to access the network.

Installed in a computer's expansion slot, the NAU provides three jacks at the back of the computer. The IN and OUT jacks are used for making network connections by plugging one NAU's OUT jack to another's IN jack. OUT to IN—sending data out of one computer and into the next—is the way to connect the STARLAN NETWORK.

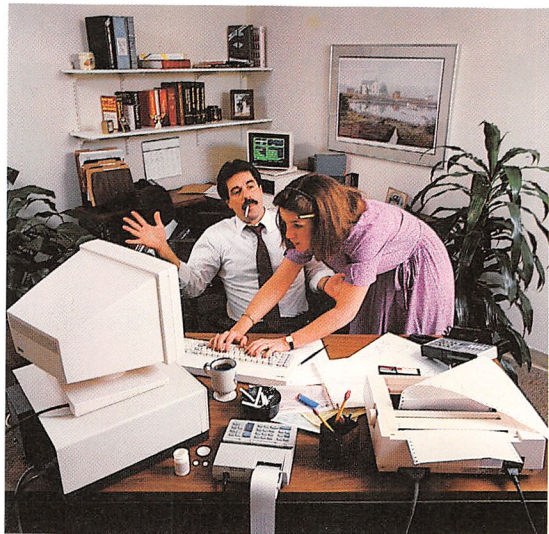
The third jack, a PHONE jack, is used only in larger networks connected through a building's phone wiring. In this network arrangement, called a Closet Star, an analog phone can be plugged into the jack and connected to the building phone system, avoiding wire clutter in an office. For a detailed description of the Closet Star, and design guidelines for all network arrangements, see the **STARLAN NETWORK Design Guide**.

An NAU is available for the AT&T PC 6300 and compatible computers and the PC 6300 PLUS; for the AT&T UNIX PC Models 7300 and 3B1; and for the AT&T 3B2 line of computers. Each NAU is packaged with a 10-foot (3-meter) modular phone cord, a diagnostic diskette, installation hardware, and installation instructions. If your computers are farther than 10 feet (3 meters) from each other, you can purchase longer cords and link them together with an inexpensive cord extension adapter.

The **AT&T PC 6300 Network Program** enables a PC 6300 or compatible computer or PC 6300 PLUS to operate as a server for MS-DOS-based personal computers, and use files and printers attached to servers. This Network Program also supports electronic mail and asynchronous terminal emulation for accessing a UNIX-based computer as a terminal. This program enables a PC to operate concurrently as a server and a network workstation. It comes packaged on diskette with a user's and server guide.

Partners Accounting has an information sharing problem common to many businesses: the two partners lack a way to quickly and conveniently share and print the spreadsheets, reports, and other information they produce at their personal computers.

Each partner has an AT&T PC 6300 equipped with a hard disk, but between them they have only one printer. When a partner wants to print a spreadsheet or letter, she must leave her desk, carry a diskette across the room, put it in the other partner's computer, then enter the print command. The other partner must stop work and wait until the print job is finished, before resuming work on the PC.



Working together on a report is just as inconvenient. The partners either swap diskettes, make and exchange printouts, or crowd behind one PC and work as best they can.

Knowing there must be a better way, they compare networks. After talking with an AT&T Account Representative, they choose the AT&T STARLAN NETWORK.

Each computer in the network requires a Network Access Unit (NAU), which is a plug-in expansion card, and a Network Program, which is the software.

The partners buy two PC 6300 NAUs and two PC 6300 Network Programs.

They install an NAU in each PC, just as they would any other plug-in expansion card.

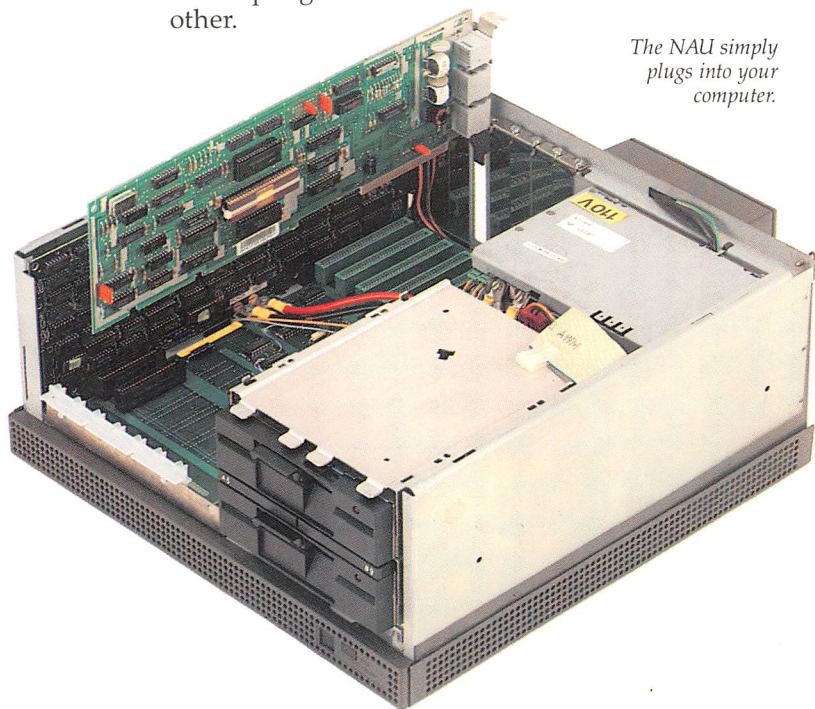
Next, they use a modular phone cord packaged with the NAUs to connect the OUT jack of one to the IN jack of the other.

After finishing this simple task, the partners install a Network Program onto each PC.

The partners designate their PC equipped with 512 Kbyte RAM and a 10-Mbyte hard disk as the server, and plug their printer into one of its printer ports. One partner uses this server concurrently as a workstation.

When they work on a report, they store it in a directory on the server. Both partners read and edit the report as if it were stored at their own PC. Each uses the network printer without interrupting the other.

*The NAU simply
plugs into your
computer.*



The PC 6300 Network Program runs on the MS-DOS 3.1 or later operating system. A PC used as a network workstation needs 256 Kbyte RAM. A PC used as a server or used concurrently needs 512 Kbyte RAM and a 10-Mbyte hard disk. To protect files against accidental loss, you should equip a server with a compatible disk expansion and tape backup unit, such as the Mountain® 6300 Combo. Additional software applications may require additional RAM.

The **AT&T UNIX PC Network Program** enables a UNIX PC Model 7300 or 3B1 to share files and printers with other UNIX PCs and 3B2s. This Network Program also supports electronic mail and asynchronous terminal emulation for accessing a UNIX-based computer as a terminal. It runs on UNIX PC System Software Version 3.0 or later. It comes packaged on diskette with a user's guide.

The **AT&T UNIX PC Server Program** enables a UNIX PC Model 7300 or 3B1 to operate as a server for MS-DOS-based personal computers. The UNIX PC Network Program must be installed before installing the Server Program and, like the Server Program, runs on UNIX PC System Software Version 3.0 or later. The Server Program comes packaged on diskette with a server guide.

A UNIX PC used as a server needs 1 Mbyte RAM and a 20 Mbyte hard disk. To protect files against accidental loss, you should equip a server with a compatible disk expansion and tape backup unit, such as the AT&T UNIX PC 23 Mbyte External Tape Backup Unit.



This STARLAN NETWORK Daisy Chain links an AT&T PC 6300 with an AT&T Model 470 dot matrix printer, two AT&T UNIX PCs, and an IBM PC.



The partners provide each employee they hire with a new AT&T PC 6300 or an AT&T UNIX PC, depending on the employee's job needs. They simply link each new PC to the Daisy Chain, either at the end or between two other PCs.

When a small accounting firm joins theirs, one of the new partners brings along an IBM PC, which the original partners add to the AT&T STARLAN NETWORK the same way they add an AT&T PC 6300.

The partners are pleased to find that the STARLAN NETWORK enables them to link their new computers to their old ones without expensive upgrading and without high-cost cabling.

You Can Easily Expand the Network

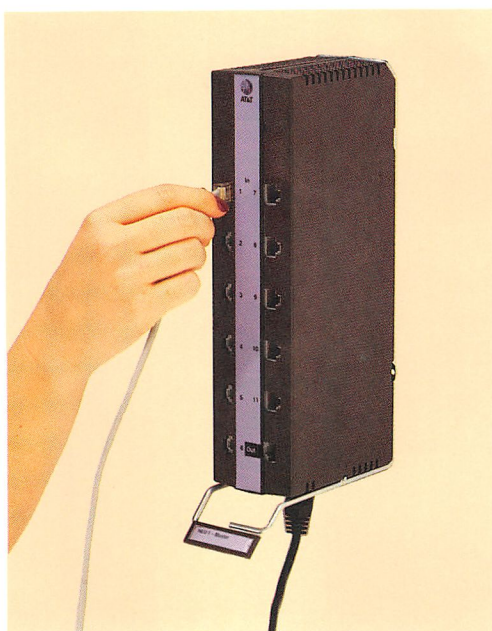
With more and more employees joining the firm, the partners decide to expand their STARLAN NETWORK with the Network Extension Unit (NEU).

First, they disconnect the Daisy Chain by powering down the network and unplugging the cords from the IN jacks of the NAUs. Next, the partners attach the NEU to an office wall and plug its power unit into a nearby electric outlet. Finally, they simply replug the cords into the IN jacks of the NEU.

The partners find that the installation is straightforward and easy.

To meet the directory and printer sharing needs of their expanded network, the partners take advantage of the serving power of the AT&T 3B2 computer. They purchase a 3B2/300, a 3B2 Network Program, a 3B2 Server Program, and a 3B2 Network Access Unit (NAU). They install the NAU and the Programs in the 3B2, then simply connect the 3B2 to the NEU with a modular phone cord.

Two administrative assistants in the firm work with information in their bosses' network directories. For these assistants, the partners purchase an RS-232C Network Interface Unit (NIU). The NIU enables a terminal located anywhere in a network to access a server as if the terminal were connected directly to the server.



Expand the network by plugging computers into a Network Extension Unit.

With modular phone cords, the partners connect two AT&T Model 4410 Teletype® terminals to the NIU, and connect the NIU to the NEU with another modular phone cord. The assistants access their bosses' network directories from the terminals just as if the terminals were connected directly to the server.

This AT&T STARLAN NETWORK arrangement is called a **Daisy Chain**. It can connect up to 10 computers, and the total length of the connecting cords can be as long as 400 feet (122 meters). Each computer in a Daisy Chain requires one basic piece of hardware—the Network Access Unit—plus the Network Program software.

The **Network Extension Unit (NEU)** extends by many times the number of computers you can connect in a STARLAN NETWORK, and the maximum distances between them. The size of a thick hardback book, the NEU can be attached to a wall behind a desk, under a table, in a corner—any out-of-the-way place. It is silent, and is powered from a standard AC outlet. It snaps into a screw-down bracket.

The NEU has 11 phone-type IN jacks for connecting personal computers, Network Interface Units (NIUs), 3B2s, or Daisy Chains. For a larger network, the NEU has one OUT jack for connecting it to another NEU.

An AT&T 3B2 computer has the power to serve an expanded network. The **3B2 Network Access Unit** serves the same function as the Network Access Units for the personal computers. It is a plug-in expansion card for all models of the 3B2, and has an IN, OUT, and PHONE jack. It comes packaged with a 10-foot (3-meter) modular phone cord, a diagnostic diskette, installation hardware, and installation instructions.

The **3B2 Network Program** enables a 3B2 to share files and printers with other 3B2s and UNIX PCs. This Network Program also supports electronic mail and asynchronous terminal emulation for accessing a UNIX-based computer as a terminal. It runs on the UNIX System V Release 3 or later operating system. It comes packaged on diskette with a user's guide.

Making Network Connections from Room to Room

Whenever the partners hire a new employee, they connect that employee's PC to the Network Extension Unit. This AT&T STARLAN NETWORK arrangement is called a Room Star.

Because all computers are linked to a single hub (the NEU), a Room Star is easier to rearrange and expand than a Daisy Chain. Of course, as in a Daisy Chain, each workstation and server in a Room Star needs its own Network Access Unit and Network Program.

In this STARLAN NETWORK Room Star, a Network Extension Unit links two AT&T PC 6300s, an AT&T PC 6300 PLUS, and an AT&T 3B2/300. An AT&T Model 470 dot matrix printer is connected to the 3B2, which is used as a file and printer server.

You've seen the AT&T STARLAN NETWORK make business run more efficiently for Partners Accounting, and grow from a simple two-user Daisy Chain to a large multi-user Room Star linking AT&T PC 6300s, IBM PCs, UNIX PCs, and 3B2s. But many companies may want to connect computers where a Daisy Chain or Room Star can't conveniently be installed—for example, in nonadjoining offices or in an office suite.

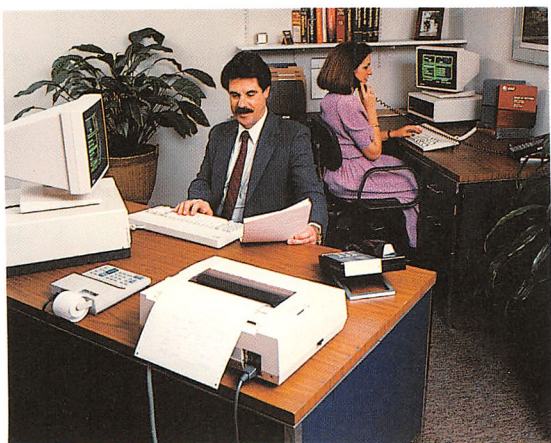
If your company needs this arrangement, the Closet Star is your solution.

Each computer or Network Interface Unit in a Closet Star plugs into an office phone outlet and connects to the network through the building's phone wiring.



A Closet Star should be designed and installed with the assistance of an AT&T technician or other phone wiring expert. The design procedure, together with detailed design guidelines for all arrangements, is described in the *STARLAN NETWORK Design Guide*. Complete installation instructions for all network configurations are presented in the *STARLAN NETWORK Installation and Maintenance Guide*.

STARLAN NETWORKs in widely separated locations can be bridged through the AT&T Information Systems Network (ISN). Information is available from your AT&T Account Representative.



Partners Accounting solved their information sharing problems with the STARLAN NETWORK, and expanded the network as their business grew. Whether you have two personal computers in an office cubbyhole, or 200 throughout a building; whether you want to retain your investment in your present MS-DOS PCs, or upgrade to AT&T UNIX PCs; whether you're an established, stable business or a rapidly expanding one, the AT&T STARLAN NETWORK will solve your information sharing problems, too.



The **3B2 Server Program** enables a 3B2 to operate as a server for MS-DOS-based personal computers. The 3B2 Network Program must be installed before installing the Server Program and, like the Server Program, runs on the UNIX System V Release 3 or later operating system. It comes packaged on diskette with a server guide.

A 3B2 used as a server needs 2 Mbyte RAM and a 32 Mbyte hard disk. To protect files against accidental loss, you should equip a 3B2 server with a compatible disk expansion and tape backup unit, such as the AT&T XM.

The **RS-232C Network Interface Unit (NIU)** enables one or two asynchronous terminals, host computers, and other RS-232C devices to link to the STARLAN NETWORK. In addition to two RS-232C DCE jacks, it includes an OUT and IN jack for linking to the network, and a PHONE jack. It comes packaged with a 10-foot (3-meter) modular phone cord, a power unit with power cord, and an installation and user's guide.

This STARLAN NETWORK arrangement is called a **Room Star**. Each computer or NIU in a Room Star can be connected to the NEU by a set of cords up to a total of 800 feet (244 meters) in length. A Daisy Chain of as many as 10 computers (PCs or 3B2s) and NIUs, with a total cord length of 400 feet (122 meters), can be plugged into each IN jack. When there are two or more NEUs in a Room Star, one is designated the Master NEU. The OUT jacks of the other NEUs are connected to the IN jacks of the Master NEU.

To avoid cord clutter and to be sure that you can easily add and rearrange PCs, you should link no more than four NEUs in a Room Star. A secondary NEU should be no more than 2.5 feet (.76 meter) from the Master NEU. Depending on the amount of data you exchange on your network, and how often your computers use the network, you can connect as many as 200 computers and NIUs in a Room Star.

AT&T STARLAN NETWORK

at a Glance

Compatible Operating Systems	MS-DOS 3.1 or later UNIX PC System Software Version 3.0 or later UNIX System V Release 3 or later
Software	AT&T PC 6300 Network Program AT&T UNIX PC Network Program AT&T UNIX PC Server Program AT&T 3B2 Network Program AT&T 3B2 Server Program
Computers	AT&T PC 6300 and PC 6300 PLUS IBM PC, PC-XT, PC-AT, and other AT&T PC 6300 compatible computers AT&T UNIX PC Models 7300 and 3B1 AT&T 3B2 line of computers
Components	Network Access Units Network Extension Unit RS-232C Network Interface Unit
Transmission Media	Modular phone cords Building phone wiring (two unshielded twisted pairs dedicated to the STARLAN NETWORK)
Configurations	Daisy Chain Room Star Closet Star
Maximum Number of Computers	Daisy Chain: 10 Star Configurations: 200, depending on software applications
Maximum Media Lengths	Daisy Chain: 400 feet (122 meters) total Room Star: 800 feet (244 meters) from workstation, server or Network Interface Unit to the Network Extension Unit Closet Star: 800 feet (244 meters) from workstation, server or Network Interface Unit to the Network Extension Unit
Transmission Speed	1 megabit per second
Access Method	Carrier Sense Multiple Access with Collision Detection (CSMA/CD)
Network Standard	Compatible with the IEEE 802.3 draft standard

Component Selection Guide

These questions help you decide the number of parts you will need for your AT&T STARLAN NETWORK Daisy Chain or Room Star. Write the appropriate number in the spaces by each question, then take the completed form to your AT&T Account Representative or authorized AT&T dealer.

1. How many AT&T PC 6300s, PC 6300 PLUSes, IBM PCs, PC-XTs, PC-ATs, and other AT&T PC 6300 compatible computers are included in your network? _____

Each personal computer requires both a Network Access Unit and a Network Program. The PC 6300 Network Program includes server and user functions.

You will need: _____ **PC 6300 Network Access Unit Kits**
_____ **PC 6300 Network Programs**

Reminder: To run the Network Program, a PC 6300 workstation requires the MS-DOS 3.1 or later operating system and 256 Kbyte RAM. The memory requirement for a PC 6300 server is 512 Kbyte RAM and a 10-Mbyte hard disk. For file protection, a server should be equipped with a compatible disk expansion and tape backup unit, such as the Mountain 6300 Combo.

2. How many AT&T UNIX PC Models 7300 and 3B1 are included in your network? _____

Each personal computer requires both a Network Access Unit and a Network Program.

You will need: _____ **UNIX PC Network Access Unit Kits**
_____ **UNIX PC Network Programs**

Reminder: To run the Network Program, either model of the UNIX PC requires UNIX PC System Software Version 3.0 or later.

3. How many UNIX PCs will you use as servers? _____

Each UNIX PC used as a server requires an AT&T UNIX PC Server Program, in addition to the UNIX PC Network Program you selected in the previous step.

You will need: _____ **UNIX PC Server Programs**

Reminder: To run the Server Program, either model of the UNIX PC requires the UNIX PC System Software Version 3.0 or later, and 1 Mbyte RAM and a 20 Mbyte hard disk. For file protection, a server should be equipped with a compatible disk expansion and tape backup unit, such as the AT&T UNIX PC 23 Mbyte External Tape Backup Unit.

4. How many AT&T 3B2s are in your network? _____

Each 3B2 requires both a Network Access Unit and a Network Program.

You will need: _____ **3B2 Network Access Unit Kits**
_____ **3B2 Network Programs**

Reminder: To run the Network Program, a 3B2 requires the UNIX System V Release 3 or later operating system.

5. How many 3B2s will you use as servers? _____

Each 3B2 used as a server requires an AT&T 3B2 Server Program, in addition to the 3B2 Network Program you selected in the previous step.

You will need: _____ **3B2 Server Programs**

Reminder: To run the Server Program, a 3B2 requires the UNIX System V Release 3 or later operating system, and 2 Mbyte RAM and a 32 Mbyte hard disk. For file protection, a server should be equipped with a compatible disk expansion and tape backup unit, such as the AT&T XM.

6. How many AT&T RS-232C Network Interface Units do you need to include? _____

You will need: _____ **AT&T RS-232C Network Interface Units**

Each Network Interface Unit links one or two asynchronous terminals, host computers, and other RS-232C devices to your network.

7. How many stand-alone computers (including PCs and 3B2s), Network Interface Units, and Daisy Chains will you connect directly to a Network Extension Unit? _____

Given this number of direct connections, use the table to determine the number of Network Extension Units you need.

Number of Direct Connections	Number of Network Extension Units
1-10	1
11-19	2
20-29	3
30-39	4

This table assumes you will leave one or more jacks empty, so that you can use them later to expand your network.

You will need: _____ **Network Extension Unit Kits**

-
8. How many secondary Network Extension Units will you connect to the Master Network Extension Unit? If your network requires only one Network Extension Unit, leave this blank. _____

Each secondary NEU requires a 2.5-foot (.76 meter) D8W modular phone cord.

You will need: _____ **2.5-foot (.76 meter) D8W Modular Cords**

9. How many modular phone cords do you need to connect computers (including PCs and 3B2s) and Network Interface Units to each other or to Network Extension Units? _____

Follow these steps to select the appropriate lengths and types of cord:

1. Lay out a route for each cord:

- For a Daisy Chain, from one computer or Network Interface Unit to another.

Reminder: The total length of the cord in a Daisy Chain can be as long as 400 feet (122 meters), and the maximum number of computers and Network Interface Units in a Daisy Chain is 10.

- For a Room Star, from each computer or Network Interface Unit to the Network Extension Unit.

Reminder: Each computer or Network Interface Unit in a Room Star can be connected to the Network Extension Unit by a set of cords up to a total of 800 feet (244 meters) in length.

To ensure an uncluttered room, route the cord from desktop to floor and along wallboards and corners. It may be inconvenient to route the cord in a straight line between computers (or Network Interface Units) or between a computer (or Network Interface Unit) and a Network Extension Unit, unless they are close together.

2. Measure the route.
3. Select the appropriate lengths of standard modular phone cord (called DW8A-DE cord).

Reminder: Each Network Access Unit is packaged with a 10-foot (3-meter) standard modular phone cord.

DW8A-DE Standard Modular Cords

You will need: _____ **10-foot (3-meter) Cords**
_____ **25-foot (7.6-meter) Cords**
_____ **50-foot (15.25-meter) Cords**
_____ **75-foot (22.9-meter) Cords**
_____ **100-foot (30.5-meter) Cords**
_____ **150-foot (45.75-meter) Cords**
_____ **200-foot (61-meter) Cords**

4. Select the appropriate lengths of plenum-type cord (called DP8B-DE cord).

Building codes may require that cords routed through walls or ceilings be a special fire-resistant cord called plenum-type cord. Ask your building manager whether it's required in your installation.

DP8B-DE Plenum-type Cords

You will need: _____ **10-foot (3-meter) Cords**
_____ **25-foot (7.6-meter) Cords**
_____ **50-foot (15.25-meter) Cords**
_____ **75-foot (22.9-meter) Cords**
_____ **100-foot (30.5-meter) Cords**
_____ **150-foot (45.75-meter) Cords**
_____ **200-foot (61-meter) Cords**

10. How many cord extension adapters do you need? _____

Cords can be linked together with an inexpensive cord extension adapter called the 451A adapter. You can use it to extend cords to reach longer distances. If you remove a computer from a Daisy Chain, you can also use this adapter to reconnect the cords that were connected to that computer's Network Access Units.

You will need: _____ **451A Cord Extension Adapters**

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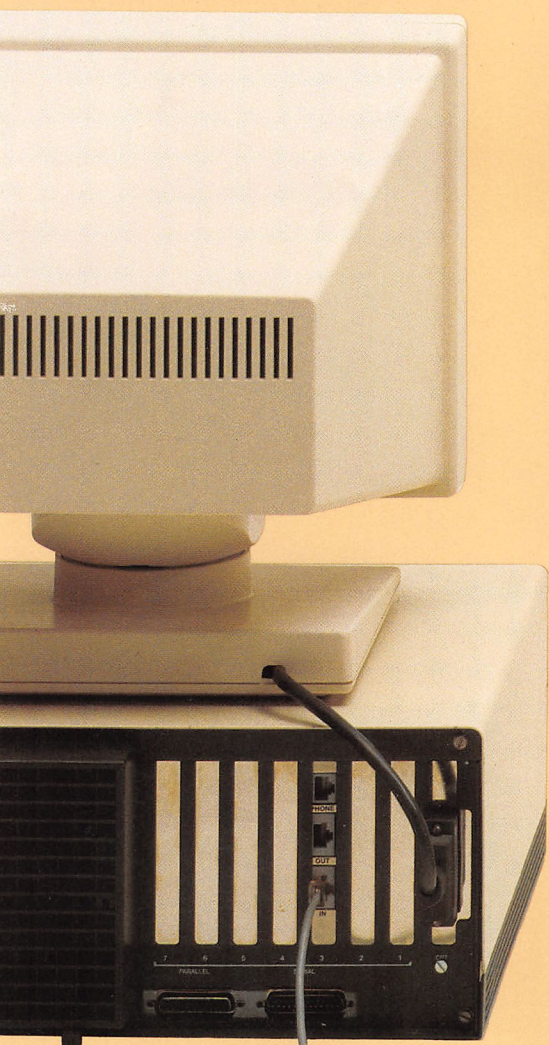
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WARNING

The equipment described here generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. The equipment has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference.

Prepared by
Technical Publications
AT&T Information Systems
Middletown, NJ 07748



999-809-100 IS